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Local Ag Research Published

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ROBB DE HAAN ('85)

Dordt researchers partnered with local farmer to explore how different crop rotations affect both water quality and profitability.

LOCAL AG RESEARCH PUBLISHED

The results of research conducted cooperatively by Dr. Robb De Haan and Dr. Ron Vos, professors of environmental studies and agriculture at Dordt College, and Matt Schuiteman, a Sioux Center farmer, are now published in the scientific journal *PLOS ONE*.

De Haan, Vos, and Schuiteman set out to answer the question: "Can Iowa cropping systems simultaneously protect water quality and be profitable?" Based on five years of data from research done on five different cropping systems, DeHaan says there are crop rotations that will significantly improve water quality. While all rotations were not as profitable as continuous corn, they did generate positive returns during the study period.

The wells in Sioux Center's east well field, like those in much of Iowa, draw from a shallow alluvial aquifer and are highly susceptible to nitrate contamination. Part of the reason for doing the research was that some Sioux Center wells have seen nitrate contamination approach levels considered unsafe by the EPA. By blending water from different sources, the city has kept the nitrate concentration in its finished drinking water below the MCL (maximum contaminant level), but the city wanted to explore ways to ensure its water supply stayed safe for the future. The research published by De Haan and his collaborators could offer farmers options for helping keep local water sources safe.

THE DETAILS

Funded by a grant from the Leopold Center at Iowa State University, the five year-project, which ran from 2009 until 2013, involved taking soil samples each June and August, and again in November, in five cropping systems:

- continuous corn
- perennial grass
- oat – (alfalfa under-seeded) – alfalfa – corn rotation
- oat (with a red clover cover crop) – corn rotation
- soybean – winter wheat – corn (with a cereal rye cover crop) rotation.

Nitrogen fertilizer was side-dressed on corn plots at rates determined by the late spring nitrate test.

"This adds to the body of scientific research out there," says De Haan, noting that such research has not been conducted on the soil types common in Northwest Iowa. The results will likely be used by scientists who model the movement of nitrates through such soils to better predict the levels of nitrate-N under various cropping scenarios.

"Considering both residual soil nitrate-N and profitability data, the oat-alfalfa-maize rotation performed the best in this setting," write the authors in the paper's abstract. They provide soil nitrate data and economic data for each cropping system they evaluated.

"Perennial grass is the best way to reduce the risk of nitrate movement to ground water, but other options can also make a big difference," says De Haan. Following the study, Schuiteman began using a corn – corn – alfalfa – alfalfa rotation, De Haan says.

SALLY JONGSMA

The article, "Soil Nitrate, Cropping Systems, and Economics," is available free of charge on the *PLOS ONE* website.